

# A Comprehensive Framework for Sustainable Project Portfolio Selection Based on Structural Equation Modeling

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## ABSTRACT

### KEY WORDS

*Portfolio Management  
Program Management  
Sustainability  
Strategic Planning*

This paper proposes an integrated approach for strategic and sustainable project portfolio selection based on a two-module model. The first module uses strategic planning and sustainability concepts to select a set of promising projects. The second module uses a project portfolio selection procedure to choose among the promising projects identified in the first module. The framework assists in assessing potential projects and choosing the optimal projects from among them. It also integrates long-term macro and short-term micro views in a formal and systematic approach.

The research studies: 1) the effects of strategic level management on sustainability, post-implementation, and overall performance; 2) the effects of implementation management on post-implementation performance; 3) the effects of portfolio selection on implementation and overall performance; and, 4) the effects of post-implementation performance on the overall performance.

## THE PROBLEM

*The state of the art methodologies do not address all the important aspects of project portfolio selection.*

Project selection problems are inherently complex with multiple and often conflicting quantitative and qualitative considerations, such as business goals, financial costs and benefits, and limitations in available resources. Selecting projects that best align with the organization's strategic priorities is the essential focus of project portfolio optimization. However, the state of the art methodologies do not address all the important aspects of project portfolio selection.

## THE FRAMEWORK

*The proposed framework aligns the strategic themes of the organization with the tactical and operational considerations.*

The proposed framework aligns the strategic themes of the organization with the tactical and operational considerations. The first module considers sustainability strategic criteria (i.e., economic, environmental, and social). The second module considers tactical and operational project portfolio selection criteria (financial, semi-financial, and non-financial).

The framework helps the decision makers to: 1) think systematically about complex project selection problems; 2) decompose the project selection problems into manageable steps; 3) carefully consider the elements of uncertainty within a structured framework; and, 4) consider sustainability within a strategic context.

## ■ THE FRAMEWORK (continued)

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**Module I: Sustainable Strategic Planning.** The sustainable strategic planning module contains the following three sub-modules: strategic level, sustainability considerations, and strategic planning.

- Strategic Level. The organizational vision, mission, and values are considered at the strategic level.
- Sustainability Considerations. Although economic analysis is the most commonly used criteria in project selection procedures, sustainability provides a balance among the economic, social, and environmental factors associated with the investment.
- Sustainability Trade-off. As a consequence of the conflicts among sustainability factors (economic, social, and environmental), the analysis requires a trade-off plan and the establishment of the priority preferences among the three dimensions.

Strategic planning involves internal and external analysis:

- Internal Analysis: Examining the inbound situation of the organization by estimation of weaknesses and strengths.
- External Analysis: Examining the outbound situation of the organization by estimation of threats and opportunities.

A proper combination of vision, mission, values, and strategy is required in order to develop the organization's desired goals. Strategic objectives provide specific and measurable goals for achieving different aspects of the vision, mission, and values. Projects are treated as action plans, similar to sets of operational activities aligned with the vision, mission, values, strategies, and goals.

*Structural equation modeling estimates the unknown coefficients in a set of linear equations. Variables in the system are usually directly observed.*

**Module II: Comprehensive Project Portfolio Selection.** Project portfolio selection is the general operational resource analysis for selecting the mix of projects that best fit the strategic goals. It includes:

- Operational Level. The operational level is assumed to link the outputs of the sustainable strategic planning module to the project portfolio management module. This module deals with the action plans and with the screening of the projects selected by the first module.
- Resource Analysis. This involves a careful consideration of a set of financial, semi-financial, and non-financial factors as follows:
  - Financial criteria: Factors that can be directly converted into monetary values (i.e., costs, revenues).
  - Semi-financial criteria: Factors that can indirectly be converted into monetary values (i.e., risks, political situations).
  - Non-financial criteria: Factors that are difficult to convert into monetary values.

Structural equation modeling estimates the unknown coefficients in a set of linear equations. Variables in the system are usually directly observed. Unmeasured latent variables cannot be observed, but relate to observed ones. Structural equation modeling consists of two components: a measurement model and a structural model. The measurement model comprises the relationships between the latent factors and the observed values of the questionnaire items. The structural (construction) model represents the path direction and strengths of the relationships of the latent variables. The structural model is used to assess the hypothesized relationships among latent factors. Structural equation modeling is the most appropriate analytical instrument to construct this kind of model.

## RESEARCH IMPLICATIONS

*This study offers several practical implications for decision makers. The framework helps the judgment of candidate projects. It also integrates long-term macro and short-term micro levels in a formal and systematic approach.*

Selecting the optimal projects in a competitive environment is crucial in sustaining corporate competitiveness, especially in the presence of multiple conflicting objectives.

The structural equation model measures the importance and effects of each module on the overall performance of the proposed framework. An application study conducted within the investment banking industry (with six latent variables and 28 observed variables) was used to check the structural equation model analysis. The hypotheses were tested using data collected from a large number of investment bankers. After revising the hypothetical model, the final structural equation model discovered the effects of the performance of the factors on the overall performance of the proposed framework.

The correct selection of projects is an important and recurring challenge. This study offers several practical implications for decision makers. The framework helps the judgment of candidate projects. It also integrates long-term macro and short-term micro levels in a formal and systematic approach.

## FULL CITATION

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